UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

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Cindy Bladey, Chief
Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: **EPA's Comments on the "Draft Supplemental Environmental Impact Statement (SEIS) for issuance of a renewed operating license, DPR-72 for the Crystal River Unit 3 Nuclear Generating Plant in Crystal River, Citrus County, Florida" (also known as the Generic Environmental Impact Statement For License Renewal of Nuclear Plants Regarding Crystal River Unit 3 Nuclear Generating Plant NUREG-1437 Supplement 44 Draft Report for Comment) EIS Filed Date: 06/02/2011; CEQ Federal Register Date: 06/10/2011; CEQ Number: 20110178; ERP No.: NRC-E06008-FL**

Dear Ms. Bladey:

Pursuant to Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the "Draft Supplemental Environmental Impact Statement (SEIS) for issuance of a renewed operating license, DPR-72 for the Crystal River Unit 3 Nuclear Generating Plant in Crystal River, Citrus County, Florida" dated May 2011. According to Mr. Daniel Doyle of the U.S. Nuclear Regulatory Commission's (NRC's) Office of Nuclear Reactor Regulation, this Draft SEIS is intended to "tier" from (and serve as a supplement to) the "programmatic" relicensing EIS issued by the NRC known as the Generic Environmental Impact Statement (GEIS) For License Renewal of Nuclear Plants.

This Draft SEIS was prepared in response to an application submitted on December 16, 2008 by Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., to renew the operating license for Crystal River Unit 3 Nuclear Generating Plant (CR-3), which features a pressurized light-water reactor (PWR), a nuclear steam supply system (NSSS) supplied by Babcock & Wilcox, and a turbine generator designed and manufactured by

Westinghouse Electric Company. The existing license, DPR-72, will expire on December 3, 2016. The NRC's Federal action is the decision on whether to renew the license for an additional 20 years. If the operating license is not renewed, EPA understands that the facility will be shut down on or before the expiration date of the current operating license. In a June 13, 2011 phone conversation with Mr. Daniel Doyle, EPA was informed that CR-3, which has a conventional domed concrete containment building, is actually currently shut down. The plant was shut down after regular maintenance in September/October 2009 revealed some cracks in the concrete containment wall (EPA's comments on this issue are discussed later in this letter). FPC has stated that it is their intention to return this nuclear unit to service, but cannot estimate a return to service or cost to repair at this time.

For renewal of a license, EPA understands that Title 10 of the Code of Federal Regulations (10 CFR 51.95(c)) states that the NRC shall prepare an EIS which is a supplement to NUREG-1437, Volumes 1 and 2, Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS). The Draft SEIS that EPA reviewed serves to meet this requirement. EPA finds that this document appropriately includes an analysis that evaluates the environmental impacts of the proposed action (relicensing) as well as considering a range of Alternatives: (1) replacement power from a new supercritical coal-fired plant; (2) a new natural gas-fired combined-cycle plant; (3) a combination of alternatives that includes some natural gas-fired capacity and energy conservation; (4) and not renewing the license (the no-action alternative).

EPA understands that the NRC's preliminary recommendation that the adverse environmental impacts of license renewal for CR-3 are not great enough to deny the option of license renewal. This recommendation is reportedly based upon: (1) the analysis and findings in NUREG-1437, Volumes 1 and 2, Generic Environmental Impact Statement for License Renewal of Nuclear Plants; (2) the environmental report submitted by FPC; (3) consultation with Federal, State, and local agencies; (4) the NRC's environmental review findings; and (5) consideration of public comments received during the scoping process

EPA understands that the NRC's environmental review process for the relicensing included the following actions, which EPA also considers to be part of the National Environmental Policy Act (NEPA) review and disclosure process:

- conducted public scoping meetings on April 16, 2009, in Crystal River, Florida
- conducted a site visit at the plant in July 2009
- reviewed FPC's environmental report (the "ER" submitted by Progress Energy in 2008) and compared it to the Draft SEIS (e.g., GEIS Supplement 44)
- consulted with other agencies
- conducted a review of the issues following the guidance set forth in NUREG-1555, Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal
- considered public comments received during the scoping process

EPA's review revealed that the Draft SEIS appropriately evaluates the potential environmental impacts of the proposed action (relicensing). The environmental impacts from the proposed action are appropriately classified as either SMALL, MODERATE, or LARGE. As set forth in the GEIS, Category 1 issues are those defined as meeting all of the following criteria:

- The environmental impacts associated with the issue are determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics.
- A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts, except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal.
- Mitigation of adverse impacts associated with the issue is considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation. For Category 1 issues, no additional site-specific analysis is required in this SEIS unless new and significant information is found.

EPA notes that Chapter 4 of the Draft SEIS presents the process for finding and evaluating new and significant information. Site-specific issues (Category 2) are those that do not meet one or more of the criteria for Category 1 issues; therefore, a site-specific review was appropriately documented in the Draft SEIS. EPA understands that the NRC has reviewed FPC's established process for finding and evaluating new and significant information on the environmental impacts of renewing the CR-3 operating license. The CR-3 ER, scoping comments, and other available data records on CR-3 were reviewed by the NRC and evaluated for new and significant information. EPA further understands that, during NRC's review, no new and significant information on Category 1 issues was identified that would change the conclusions presented in the GEIS. Therefore, for these Category 1 issues, NRC believes that impacts during the renewal term are not expected to exceed those discussed in the GEIS.

In summary, EPA notes the following assumptions and conclusions of the Draft SEIS:

1. The NRC did not note any Category 2 issues for land use, nor did the Staff find any new and significant information during the environmental review.

2. The NRC did not note any Category 2 issues for air quality impacts, nor did the Staff find any new and significant information during the environmental review.

3. The NRC evaluated the direct and indirect impacts due to groundwater use conflicts during the license renewal term and concluded that the impacts would be SMALL.

4. All surface water issues are considered Category 1. The NRC did not find any new and significant information during the environmental review.

5. The NRC evaluated the direct and indirect impacts of entrainment, impingement, and heat shock from continued operations during the license renewal term on fish and shellfish and concluded that the impacts would be SMALL to MODERATE.

6. With the exception of threatened or endangered species, all terrestrial ecology issues are considered Category 1, and, for these, the NRC did not find any new and significant information during the environmental review.

7. With regard to Category 1 human health issues during the license renewal term—microbiological organisms (occupational health), noise, radiation exposures to public, and occupational radiation exposures—the NRC did not identify any new and significant information during the environmental review.

8. For Category 1 issues (public services and aesthetic impacts), no new and significant information was found during the environmental review. Therefore, there would be no impacts beyond those discussed in the GEIS. There should be no impact on housing during the license renewal term beyond what has already been experienced, and demand for public water services will remain relatively unchanged with no additional demand.

9. There should be no land use impacts related to population or tax revenues and no transportation impacts, and no impacts to known historic and archaeological resources are expected from the continued operation of CR-3 during the license renewal term.

10. With respect to environmental justice, the NRC also finds that no disproportionately high and adverse human health impacts would be expected in special pathway receptor populations in the region as a result of subsistence consumption of water, local food, fish, and wildlife.

EPA's comments on Aquatic Monitoring at CR-3

EPA commends FPC for the extensive aquatic monitoring programs. The current NPDES permit (FL0000159) for Crystal River Energy Complex (CREC) Units 1, 2, and 3 requires seasonal flow restrictions and stock enhancement of a number of important aquatic species (red drum, spotted seatrout, pink shrimp, striped mullet, pigfish, silver perch, blue crab, and stone crab) in order to comply with Clean Water Act Section 316(b). While there are currently no requirements in the NRC operating license for CR-3 to monitor aquatic resources (including specific aquatic ecological monitoring of the algal community, benthic invertebrates, or fish), FPC has nevertheless reportedly conducted a year of sampling events for the Cross Florida Barge Canal (CFBC) and CREC discharge area to characterize the aquatic communities in both of these areas. This work has reportedly included the following items listed below. EPA recommends that any changes or new results should be either presented or referenced in the Final SEIS as appropriate (cite reports or technical documents, etc.).

1. Four (4) stations in the CFBC were sampled, extending from the Inglis Lock downstream to the mouth of the CFBC at the Gulf of Mexico and offshore of the mouth of the CFBC. Two

(2) other stations associated with the CREC discharge were also sampled to establish background data on aquatic communities at the point of discharge into Crystal Bay and offshore of the point of discharge. These six (6) stations were all sampled for motile macroinvertebrates, plankton, invertebrates, and fish.

2. Water quality in the CFBC was assessed during multiple sampling events, including mineral concentrations, dissolved oxygen, carbon, temperature, salinity, pH, dissolved solids, and suspended solids were measured. Water quality in the CREC was measured at stations 3 and 4, and at two additional stations within the CREC discharge canal structure. Mineral concentrations, carbon, dissolved oxygen, temperature, pH, salinity, dissolved solids and suspended solids were measured.
3. The Old Withlacoochee River (OWR) stations were established to provide additional information about aquatic communities occurring between the Inglis Dam and the CFBC in the OWR. Water-quality samples were collected while biological sampling was conducted over a 3-month period.

EPA's comments on the Severe Accident Mitigation Alternative (SAMA) Risk Analysis: Plant Flooding

The Draft SEIS notes in Table F-1 "Crystal River Unit 3 Nuclear Generating Plant Core Damage Frequency (CDF)" that potential event of internal flooding was calculated to have a frequency of 4.0×10^{-7} using a peer reviewed PSA model. The CDF is reportedly based upon the risk assessment for only internally-initiated events, which includes internal flooding. FPC did not include the contribution from external events in the CR-3 risk estimates; however, it did account for the potential risk reduction benefits associated with external events by multiplying the estimated benefits for internal events by a factor of 2. EPA recommends that the Final SEIS should provide additional information about the risks of internal flooding due to both internal and external events.

EPA's comments on Radiological Wastes

EPA notes that the NRC staff did not find any new and significant information related to the uranium fuel cycle and waste management during its review of the CR-3 environmental report (ER), the site visit, or the scoping process. NRC reports that there are nine (9) "generic" issues related to the fuel cycle and waste management, but found that "there are no site-specific issues." For Category 1 issues, the Draft SEIS concludes that the impacts are SMALL, except for the offsite radiological collective impacts from the fuel cycle and from high-level waste and spent fuel disposal, which the NRC has concluded to be acceptable.

EPA notes that the collective offsite radiological impacts are addressed in the Draft SEIS, which states that "the 100-year environmental dose commitment to the U.S. population from the fuel cycle, high-level waste, and spent fuel disposal is calculated to be about 14,800 person rem, or 12 cancer fatalities, for each additional 20-year power reactor operating term." The NRC believes that much of this, especially the contribution of radon releases from mines and tailing piles, consists of "tiny doses summed over large populations." The Draft SEIS reports that

"despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made." Even taking the uncertainties into account, the NRC concludes that these impacts "are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated."

EPA notes that the NRC determined (on September 15, 2010) that radioactive wastes from nuclear power plants can be safely stored for at least 60 years beyond the licensed life of any reactor. The "Waste Confidence" regulation (formal title: "Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation" in 10 CFR 51.23) revised the number of storage years upward by 30 years. Specifically, the NRC found that "if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations (ISFSIs)."

The Draft SEIS notes that the NRC also found "reasonable assurance" that sufficient mined geologic repository capacity will be available for disposal of spent fuel "when necessary." The Draft SEIS further states that for the high-level waste and spent fuel disposal component of the fuel cycle, there are "no current regulatory limits for offsite releases of radionuclides for the current candidate repository site." However, the NRC believes that if it is assumed that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence regulation, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 milliroentgen equivalent man (millirem) per year or less. EPA notes that our agency has already developed standards (40 CFR Part 191) to protect the population by imposing the amount of radioactive material released over 10,000 years. The cumulative release limits are based on the EPA's population impact goal of 1,000 premature cancer deaths worldwide for a 100,000 metric ton repository.

EPA recommends that the Final SEIS clarify and provide additional information as to the Waste Confidence (WC) regulation's specific impacts on the CR-3 facility, as this new determination finds that spent nuclear fuel can be stored "safely and securely" without significant environmental impacts (for at least 60 years after operation) at a facility that is located in a Federal Emergency Management Agency (FEMA) designated high-velocity wind zone and that has the potential for substantial coastal flooding and significant storm surge. Specifically, EPA recommends that the NRC perform a technical evaluation of a worst case flooding scenario of an Independent Spent Fuel Storage Installation (ISFSI) containing a maximum load of spent fuel during the WC rule time frame (the assumption here is that there will be no Yucca Mountain or other repository in the short term, i.e., 20 to 60 years). The radiation dose to the most critical member of the public should be calculated and documented in the Final EIS.

In conclusion, EPA also recommends that the Final SEIS cite any new analyses for longer-term storage regarding scientific knowledge relating to spent fuel storage and disposal. The Final SEIS should also mention any developments with the Presidential Blue Ribbon Commission on alternatives for dealing with high-level radioactive waste if there are such developments before Final SEIS publication.

EPA's comments on the Draft SEIS in light of the NRC's Fukushima Task Force Report

While EPA believes that U.S. reactors are routinely operated with the most stringent safety protocols/procedures and it is very improbable that a similar series of coincident events could lead to a Fukushima type accident/crisis here in the U.S., EPA nevertheless strongly believes that improving nuclear power plant safety should be a continual and dynamic effort. EPA was, therefore, greatly encouraged by the NRC's recent publication known as the "Recommendations for Enhancing Reactor Safety in the 21st century: The Near Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident." EPA notes that this report proposes needed improvements in a variety of areas, including "loss of power" response, safety of spent fuel pools, and preparedness for natural events. We understand that the report has been presented to the NRC Commissioners, who after being formally briefed, will have the task force host a public meeting on July 28, 2011 on the report, and then have the task force members appear before the Advisory Committee on Reactor Safeguards on Aug. 17, 2011. EPA understands that additional meetings may be scheduled to seek public input on the recommendations, and that final action on the report's recommendations will then be up to the Commission.

The report states that there has unfortunately existed a historical "patchwork of regulatory requirements" that needs to be modernized with a more logical, systematic and coherent regulatory framework. The report was produced by NRC experts who collectively have over 130 years of reactor regulatory experience, and will be followed by a more in-depth report as additional information about the Fukushima reactors becomes available. EPA notes the following important findings in the report, and we ask that the Final SEIS address these recommendations as they may pertain to CR-3.

1. Currently the NRC has requirements for protection and mitigation of "design-basis" events, requirements for some "beyond-design-basis" events through regulations, and voluntary "industry initiatives" to address severe accident issues. EPA concurs with the statement that "consistent with the NRC's organizational value of excellence, the Task Force believes that improving the NRC's regulatory framework is an appropriate, realistic and achievable goal."

2. Continued operation and continued licensing activities should not pose an imminent risk to public health and safety, the report added, and EPA believes this should be true at CR-3 as well. The report notes the following, which EPA believes should be applied to CR-3:

    a. Requiring plants to reevaluate and upgrade as necessary their design-basis seismic and flooding protection of structures, systems and components for each operating reactor and reconfirm that design basis every 10 years.

    b. Strengthening Station Black Out (SBO) mitigation capability for existing and new reactors for "design-basis" and "beyond-design-basis" natural events – such as floods, hurricanes, earthquakes, tornadoes or tsunamis – with a rule to set minimum coping time without offsite or onsite AC power at 8 hours; establishing equipment, procedures and training to keep the core and spent fuel pool cool at least 72 hours; and preplanning and pre-staging offsite resources to be delivered to the site to support uninterrupted core and pool cooling and coolant system and containment integrity as needed.

    c. Requiring that facility emergency plans address prolonged station blackouts and events involving multiple reactors.

    d. Requiring additional instrumentation and seismically protected systems to provide additional cooling water to spent fuel pools if necessary; and requiring at least one system of electrical power to operate spent fuel pool instrumentation and pumps at all times (the Task Force noted it will take some time for a full understanding of the sequence of events and condition of the spent fuel pools).

    e. Strengthening and integrating onsite emergency response capabilities such as emergency operating procedures, severe accident management guidelines and extensive damage mitigation guidelines.

EPA's comments on the issues related to the CR-3 Containment Building and request for additional information in the Final SEIS:

EPA understands that during a maintenance activity performed (October 2009) under the direction and authorization of the licensee (FPC) to cut an opening in the CR-3 containment building for access to replace steam generator units, the CR-3 containment building was discovered to have one or more separations (also called "delaminations" or "gaps") between the poured concrete perimeter wall of the containment building and the horizontally installed steel reinforcing tendons placed from top to bottom around the containment building within 10 inches of the outermost part of the 42-inch thick concrete perimeter wall of the containment building. EPA also understands that a second gap in the reactor's concrete containment wall was recently indentified during the recent late stages of re-tensioning the building (March 2011). Further, we understand that the size of reinforcing steel tendons in the containment wall varies from other similar structures, and may not have as much steel, which may lead to cracking.

On June 15, 2011, EPA requested from NRC (Project Manager Mr. Daniel Doyle) and received shortly afterwards the "Safety Evaluation Report (SER) With Open Items Related to the License Renewal of Crystal River Unit 3 Nuclear Generating Plant" (dated December 2010), which we are currently reviewing. EPA notes that the SER states that "during hydro-demolition of the containment concrete in October 2009, a crack was identified in the concrete near the horizontal tendons, approximately 9 inches from the outer surface of the containment, on all four sides of the temporary opening." The SER specifically requests that the applicant provide the NRC with information about the containment concrete, prestressing tendons, and the containment liner plate, and to identify and explain any changes in plant-specific operating experiences. The SER also mentions that the NRC has asked the applicant whether a plant-specific program is necessary to manage aging of the containment. Of note, the SER also comments on the plant's Fire Protection Program, and mentions that NRC staff has found "gross degradation (e.g., loss of material, cracking due to delamination and separation) of fire barriers is detectable by visual inspection."

EPA has the following comments related to the repair issue(s) and the Draft SEIS:

1. EPA requests that the Final SEIS address/disclose the ``root-cause" of these structural failures in what we understand is supposed to be a monolithic concrete perimeter wall. EPA recommends that the Final SEIS either include this information or cite a reference to documents and technical reports that address these structural failures and the long term prognosis for the containment building.

2. EPA also recommends that the Final SEIS address/disclose (or reference appropriate technical reports) the testing procedures, such as Impulse Testing or Impact Echo testing, used to determine concrete cracking and failures and to fully validate the entirety of the CR-3 containment building. The Final SEIS should also address/disclose (or reference appropriate technical reports) the results of any destructive testing that have been used to make visual inspections of small areas of the CR-3 containment structure.

3. Finally, the Final SEIS should address/disclose (or reference appropriate technical reports) the results of a previously proposed plan to remove 10 inches of concrete from the outer part of the 42-inch containment building wall from top to bottom and 360-degrees around and effectively expose the entirety of the surrounding tendons and allow visual inspection of the inner side of the tendons to make certain that no separation between the tendons and the inner part of the concrete wall exist. The SER mentions that the NRC has requested that the applicant provide updated information on the latest prestressing tendons and results of the repair of the containment delamination that is currently in progress, and the Final SEIS should also address/disclose (or reference appropriate technical reports) these results.

4. EPA notes that FPC announced on June 27, 2011 that it will attempt to repair the problem areas — at a potential reported cost of up to $1.3 billion — rather than closing it permanently. EPA understands that FPC reportedly considered decommissioning the plant because of the large cost to repair its nuclear reactor building, but decided that repairing the nuclear plant will be more cost effective over the long run because of the lower cost to produce nuclear energy. EPA understands that PEF hopes to have the power plant on-line (running again) in 2014.

EPA's Rating of the Draft SEIS

EPA rates this Draft SEIS as "EC-2" (Environmental Concerns – additional information requested). While the Draft SEIS contains significant information that allowed EPA to assess most environmental impacts as part of our mission to fully protect human health and the environment, EPA has requested additional clarifying information on the on-going structural safety analysis and repairs of the containment building, information on the potential impacts for indefinite storage of spent fuel at CR-3 in light of the new "Waste Confidence" regulation, and implementation at CR-3 of the recommendations made in NRC's recent Fukushima Task Force Report. The identified additional information (data, analyses, and/or discussions) should be included (or referenced as appropriate) in the Final SEIS.

If you wish to discuss EPA's comments, please contact me at 404/562-9611 (mueller.heinz@epa.gov) or Paul Gagliano, P.E. of my staff at 404/562-9373 (gagliano.paul@epa.gov) .

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

cc
Daniel Doyle
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Mail Stop O-11F1
Washington, D.C. 20555-0001

Lloyd Generette, EPA Region 4
Rick Button, EPA Region 4